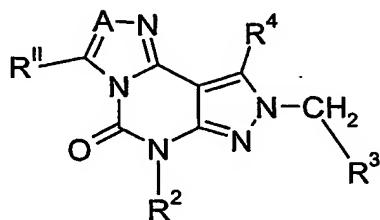


Claims:

1. A compound having the structural formula (I):

5



(I)

wherein,

A is N or CR¹;

10 R¹ is, independently at each instance, H, halogen, cyano, nitro, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted alkoxy, optionally substituted amino, optionally substituted carboxy, optionally substituted carbonyl, optionally substituted carbamide, optionally substituted sulfide, optionally substituted sulphone, optionally substituted sulfoxide, optionally substituted sulphamide;

15 R¹¹ is, independently at each instance, H, halogen, cyano, nitro, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted alkoxy, optionally substituted amino, optionally substituted carboxy, optionally substituted carbonyl, optionally substituted carbamide, optionally substituted sulfide, optionally substituted sulphone, optionally substituted sulfoxide, optionally substituted sulphamide;

20 R² is H, optionally substituted alkyl, optionally substituted alkylcycloalkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted cycloalkenyl, optionally substituted cycloalkynyl, optionally substituted aryl, optionally substituted alkoxy, optionally substituted amino, or optionally substituted heterocycle;

25 R³ is a monocyclic or bicyclic, saturated or unsaturated, ring system comprising 0, 1, 2 or 3 heteroatoms independently selected from N, O, or S, the ring being substituted by 0, 1, 2 or 3 substituents selected from =O, halogen, -OR^a, C₁₋₆alkyl, C₁₋₆haloalkyl, -CN, nitro, -S(=O)_nR^c, -O(CH₂)_mHet, -O(CH₂)_mC(=O)Het, -O(CH₂)_mC(=O)NR^aR^a, -O(CH₂)_mC(=O)OR^a, -O(CH₂)_mNR^aR^a, -O(CH₂)_mOR^a, -S(CH₂)_mHet, -S(CH₂)_mC(=O)Het, -S(CH₂)_mC(=O)NR^aR^a, -S(CH₂)_mC(=O)OR^a, -S(CH₂)_mNR^aR^a, -S(CH₂)_mOR^a, -NR^aR^a, -NHC(=O)R^a, N=NR^a,

30 -S(CH₂)_mC(=O)OR^a, -S(CH₂)_mNR^aR^a, -S(CH₂)_mOR^a, -NR^aR^a, -NHC(=O)R^a, N=NR^a,

aminocarbonyl, phenyl, benzyl; or R^3 is represented by -Het, -Het-Het, R^5 , - R^5 -Het, -Het- R^5 , -Het-O- R^5 , - R^5 - R^5 , - R^5 -OR 5 ;

R^4 is a monocyclic or bicyclic, saturated or unsaturated, ring system, or a vicinal-fused derivative thereof, which may contain from 5 to 12, preferably 5 to 10, ring atoms, 0, 1, 2, 3 or 4 of which are heteroatoms independently selected from N, O, or S, the ring system being substituted by 0, 1, 2 or 3 substituents selected from B(OH) $_2$, vicinal -OCH $_2$ CH $_2$ O-, vicinal -OC $_{1-2}$ haloalkylO-, vicinal -OCH $_2$ O-, vicinal -CH $_2$ OCH $_2$ O-, =O, halogen, -R b OR a , -SR a , -OR a , C $_{1-6}$ alkyl, C $_{1-6}$ haloalkyl, -CN, -S(=O) $_n$ R c , -O(CH $_2$) $_m$ Het, -O(CH $_2$) $_m$ C(=O)Het, -O(CH $_2$) $_m$ C(=O)NR a R a , -O(CH $_2$) $_m$ C(=O)OR a , -O(CH $_2$) $_m$ NR a R a , -O(CH $_2$) $_m$ OR a , -S(CH $_2$) $_m$ Het, -S(CH $_2$) $_m$ C(=O)Het, -S(CH $_2$) $_m$ C(=O)NR a R a , -S(CH $_2$) $_m$ C(=O)OR a , -S(CH $_2$) $_m$ NR a R a , -S(CH $_2$) $_m$ OR a , -NR a R a , -NHC(=O)R a , -NHC(=O)OR a , N=NR a , NO $_2$, -C(=O)NR a R a , -C(=O)NR a OR a , -C(=O)NR a (R b NR a R a), -C(=O)NR a (R b OR a), -C(=O)NR a (R b S(=O) $_n$ R a), -C(=O)NR a (R b Het), -C(=O)OR a , -OC(=O)R a , -C(=O)OR b NR a R a , -C(=O)R a , -C(=O)R b NR a R a , -C(=NOR a)R a , -C(=NCN)R a , -S(=O) $_2$ NR a R a , -NR a S(=O) $_2$ R a , -S(=O) $_2$ NR a (R b C(=O)NR a R a), -S(=O) $_2$ NR a (R b C(=O)OR a), aminocarbonyl, phenyl, benzyl; or R^4 is represented by -(CH $_2$) $_n$ R 5 -Het, -(CH $_2$) $_n$ R d , -Het, -Het-Het, R^5 , - R^5 -Het, -Het- R^5 , -Het-OR 5 , R^5 - R^5 , or - R^5 -OR 5 ; or R^4 is represented by C $_{1-6}$ alkyl, -NC $_{1-6}$ alkyl, or -N(C $_{1-6}$ alkyl) $_2$ wherein the C $_{1-6}$ alkyl, -NC $_{1-6}$ alkyl, -N(C $_{1-6}$ alkyl) are substituted by 0, 1 or 2 substituents selected from R a , OR a , halogen or phenyl wherein R 4 is not -(CH $_2$) $_z$ CH $_3$, -(CH $_2$) $_z$ CH $_2$ OH, -(CH $_2$) $_z$ CO $_2$ H, or -(CH $_2$) $_z$ CO $_2$ C $_{1-6}$ alkyl wherein z is 1,2,3,4,5, or 6;

R^5 is independently at each instance, phenyl substituted by 0, 1, 2, or 3 groups selected from halogen, C $_{1-6}$ haloalkyl, -OC $_{1-6}$ haloalkyl, C $_{1-6}$ alkyl, -CN, nitro, -OR a , -S(=O) $_n$ R c , -O(CH $_2$) $_m$ Het, -O(CH $_2$) $_m$ C(=O)Het, -O(CH $_2$) $_m$ C(=O)NR a R a , -O(CH $_2$) $_m$ C(=O)OR a , -O(CH $_2$) $_m$ NR a R a , -O(CH $_2$) $_m$ OR a , -S(CH $_2$) $_m$ Het, -S(CH $_2$) $_m$ C(=O)Het, -S(CH $_2$) $_m$ C(=O)NR a R a , -S(CH $_2$) $_m$ C(=O)OR a , -S(CH $_2$) $_m$ NR a R a , -S(CH $_2$) $_m$ OR a , -R b OR a , -SR a , -C(=O)NR a R a , -C(=O)NR a OR a , -C(=O)NR a R b NR a R a , -C(=O)NR a R b OR a , -C(=O)NR a R b S(=O) $_n$ R a , -C(=O)NR a R b Het, -C(=O)OR a , -OC(=O)R a , -C(=O)OR b NR a R a , -C(=O)R a , -C(=O)R b NR a R a , -C(=NOR a)R a , -C(=NCN)R a , -S(=O) $_2$ NR a R a , -NR a S(=O) $_2$ R a , -S(=O) $_2$ NR a R b C(=O)NR a R a , or -S(=O) $_2$ NR a R b C(=O)OR a ;

30

R a is, independently at each instance, H, C $_{1-6}$ alkyl, -C(=O)C $_{1-4}$ alkyl, C $_{1-4}$ haloalkyl, phenyl, benzyl, or 5 or 6-membered ring, saturated or unsaturated heterocycle containing 1,2,3, or 4 heteroatoms independently selected from N, O or S;

R^b is, independently at each instance, C_{1-6} alkyl, $-C(=O)C_{1-4}$ alkyl, C_{1-4} haloalkyl, phenyl, benzyl, or 5 or 6-membered ring, saturated or unsaturated heterocycle containing 1,2,3, or 4 heteroatoms independently selected from N, O or S;

R^c is C_{1-6} alkyl, C_{1-4} haloalkyl, phenyl or benzyl;

5 R^d is phenyl substituted by 0, 1 or 2 groups selected from -CN, halogen, nitro, C_{1-6} alkyl, C_{1-4} haloalkyl, -OH, -OR^c, -NR^aR^a, -S(=O)_nR^c, -C(=O)NR^aR^a, -C(=O)OR^a, -NR^aC(=O)R^a, -OC(=O)R^a, B(OH)₂, vicinyl -OCH₂CH₂O-, vicinyl -OC₁₋₂haloalkylO-, vicinyl -OCH₂O-, vicinyl -CH₂OCH₂O-, phenyl, benzyl and a 5- or 6-membered ring, saturated or unsaturated heterocycle containing 1, 2, 3 or 4 heteroatoms independently selected from N, O, or S;

10 - m is 1, 2 or 3; -

n is 0, 1 or 2;

or a pharmaceutically acceptable salt thereof.

15 2. A compound as recited in Claim 1 wherein:

A is N or CR²⁰ wherein R²⁰ is H, halogen, cyano, C_{1-6} alkyl, C_{1-6} alkenyl, C_{1-6} alkynyl, -OC₀₋₄alkyl, -N(C₀₋₄alkyl)(C₀₋₄alkyl).

3. A compound as recited in Claim 1 wherein:

20 R^I is H, halogen, cyano, nitro, C_{1-6} alkyl, C_{1-6} alkenyl, C_{1-6} alkynyl, S(=O)_n C_{1-4} alkyl, -S(=O)_nN(C₁₋₄alkyl)_n, -OC₀₋₄alkyl, -N(C₀₋₄alkyl)(C₀₋₄alkyl), -C(=O)OC₁₋₄alkyl, -C(=O)C₀₋₄alkyl, or -C(=O)N(C₀₋₄alkyl)(C₀₋₄alkyl) where n is 0, 1 or 2.

4. A compound as recited in Claim 1 wherein:

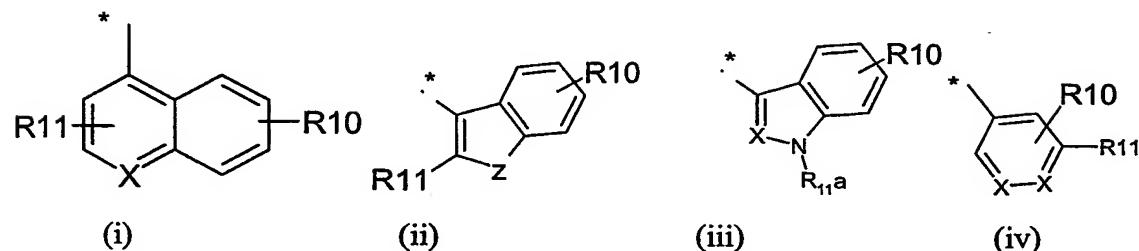
25 R^{II} is H, halogen, cyano, nitro, C_{1-6} alkyl, C_{1-6} alkenyl, C_{1-6} alkynyl, S(=O)_n C_{1-4} alkyl, -S(=O)_nN(C₁₋₄alkyl)_n, -OC₀₋₄alkyl, -N(C₀₋₄alkyl)(C₀₋₄alkyl), -C(=O)OC₁₋₄alkyl, -C(=O)C₀₋₄alkyl, or -C(=O)N(C₀₋₄alkyl)(C₀₋₄alkyl) where n is 0, 1 or 2.

5. A compound as recited in Claim 1 wherein:

30 R^2 is C_{1-6} alkylC₃₋₆cycloalkyl or - C_{1-6} alkyl wherein either is optionally substituted with 0, 1, 2 or 3 substituents selected from Het, S(=O)_nR^c, -S(=O)_nNR^aR^a halogen, -CN, -OR^a, -NR^aR^a, -C(=O)OR^a, -C(=O)R^a, -C(=O)NR^aR^a, -OC(=O)C₁₋₄alkyl, or -NR^aC(=O)C₁₋₄alkyl and n is 0, 1 or 2.

6. A compound as recited in Claim 1 wherein:

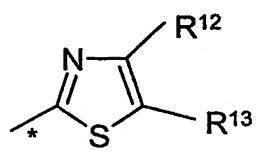
R^3 is selected from formulas (i), (ii), (iii) or (iv) set forth below:



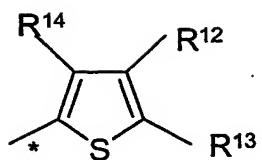
wherein * is the location where (i) or (ii) or (iii) or (iv) is attached to structural formula (I), and X is C or N; and Z is O or S, wherein R^{10} is at any position on the ring and R^{10} and R^{11} are independently at each instance H, R^a , halogen, -CN, nitro, OR^a , CF_3 , $-NR^aR^a$, $-C(=O)OR^a$, $-C(=O)R^a$, $-C(=O)NR^aR^a$, $-OC(=O)C_{1-4}alkyl$, $-NR^aC(=O)C_{1-4}alkyl$ or $-S(=O)_nR^c$; and wherein R^{11a} is R^a , $-S(=O)_2NR^aR^a$ or $-S(=O)_nR^c$ and $n=1$ or 2.

10 7. A compound as recited in Claim 1 wherein:

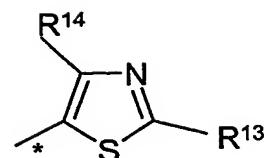
15 R^4 is selected from formulas (a) to (z) or (aa) or (ab) set forth below:



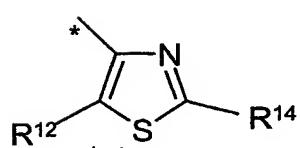
(a)



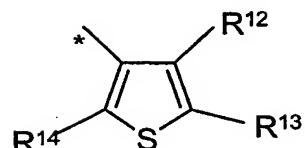
(b)



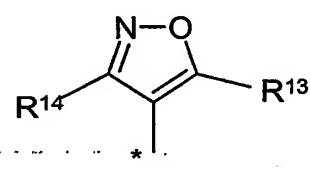
(c)



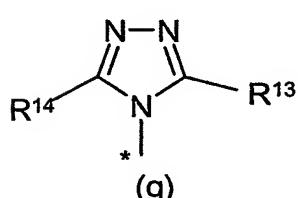
(d)



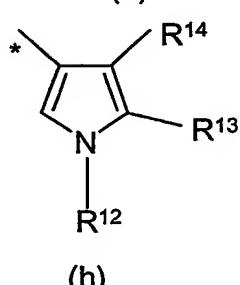
(e)



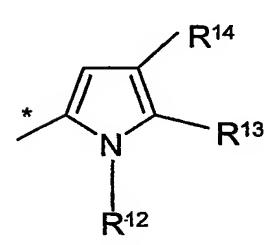
(f)



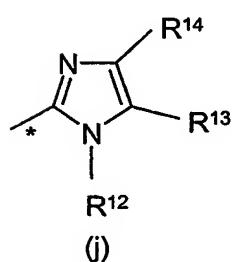
(g)



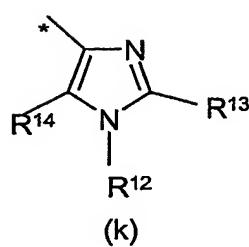
(h)



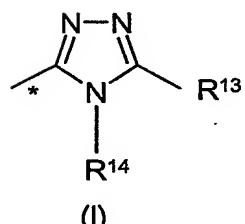
(i)



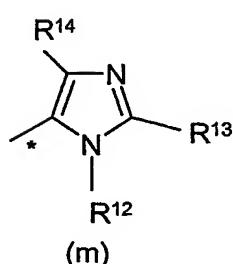
(j)



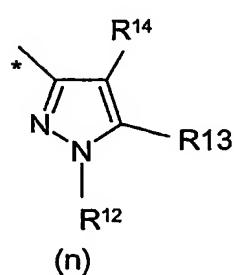
(k)



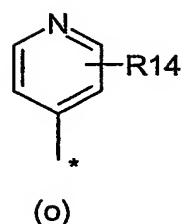
(l)



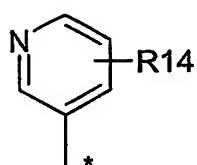
(m)



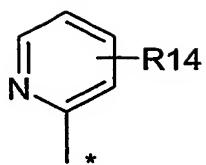
(n)



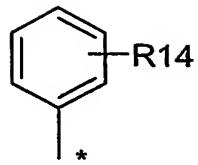
(o)



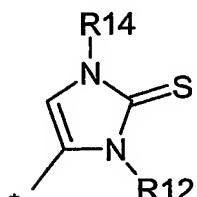
(p)



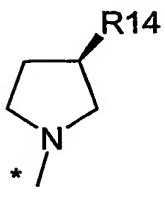
(q)



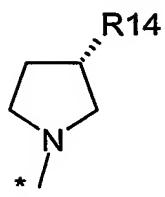
(r)



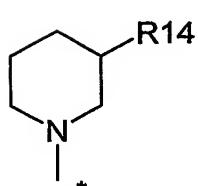
(s)



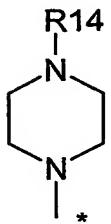
(t)



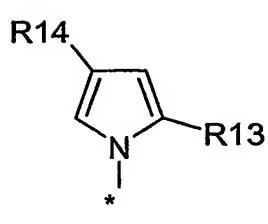
(u)



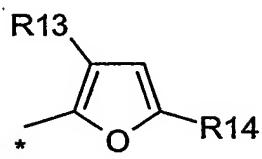
(v)



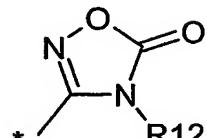
(w)



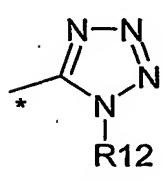
(x)



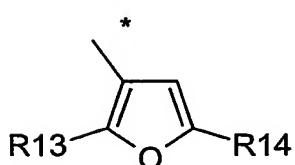
(y)



(z)



(aa)



(ab)

wherein * is the location wherein R⁴ is attached to the ring system and wherein
 wherein R¹², R¹³ and R¹⁴ are each independently represented by H, Het, C₁₋₆alkyl, -CN, -
 NR^aR^a, -nitro, -C(=O)R^a, -C(=O)NR^aR^a, -C(=O)NR^aS(=O)R^a, -C(=O)NR^a-Het, -

$\text{C}(\text{=O})\text{NR}^a\text{NR}^a\text{R}^a$, $-\text{C}(\text{=O})\text{NR}^a(\text{R}^b\text{NR}^a\text{R}^a)$, $-\text{C}(\text{=O})\text{NR}^a(\text{R}^b\text{OR}^a)$, $-\text{C}(\text{=O})\text{NR}^a(\text{R}^b\text{S}(\text{=O})_2\text{R}^a)$, $-\text{C}(\text{=O})\text{NR}^a\text{R}^b\text{Het}$, $-\text{C}(\text{=O})\text{NR}^a\text{OR}^a$, $-\text{C}(\text{=O})\text{R}^b\text{NR}^a\text{R}^a$, $-\text{C}(\text{=NOR}^a)\text{R}^a$, $-\text{C}(\text{=NCN})\text{R}^a$, $-\text{C}(\text{=O})\text{OR}^a$, $-\text{C}(\text{=O})\text{OR}^b\text{NR}^a\text{R}^a$, $-\text{C}(\text{=O})\text{R}^a$, $-\text{OC}(\text{=O})\text{R}^a$, $-\text{C}(\text{=O})\text{R}^a\text{-SR}^a$, $=\text{S}$, $-\text{NR}^a\text{C}(\text{=O})\text{R}^a$, $-\text{NR}^a\text{C}(\text{=O})\text{OR}^a$, $-\text{NR}^a\text{S}(\text{=O})_2\text{R}^b$, $-\text{C}(\text{=NOR}^a)\text{R}^a$, $-\text{S}(\text{=O})_2\text{R}^a$, $-\text{S}(\text{=O})_2\text{NR}^a\text{R}^a$, $-\text{S}(\text{=O})_2\text{NR}^a(\text{R}^b\text{C}(\text{=O})\text{NR}^a\text{R}^a)$, or $-\text{S}(\text{=O})_2\text{NR}^a(\text{R}^b\text{C}(\text{=O})\text{OR}^a)$.

8. A compound as recited in Claim 1 wherein:

A is N or CR^{20} wherein R^{20} is H , halogen, cyano, C_{1-6} alkyl, C_{1-6} alkenyl, C_{1-6} alkynyl, $-\text{OC}_{0-4}$ alkyl, $-\text{N}(\text{C}_{0-4}\text{alkyl})(\text{C}_{0-4}\text{alkyl})$;

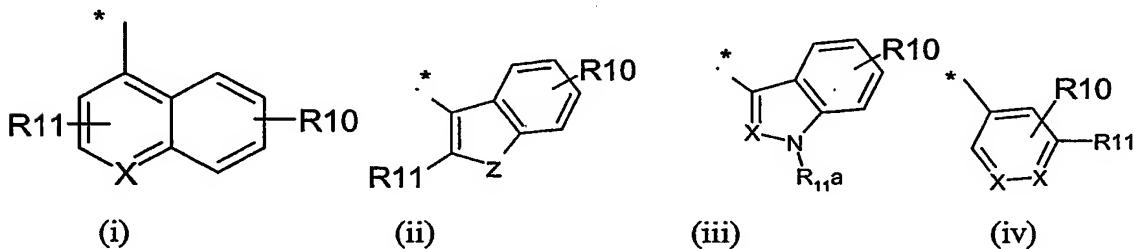
R^1 is H , halogen, cyano, nitro, C_{1-6} alkyl, C_{1-6} alkenyl, C_{1-6} alkynyl, $\text{S}(\text{=O})_n\text{C}_{1-4}$ alkyl, $-\text{S}(\text{=O})_n\text{N}(\text{C}_{1-4}\text{alkyl})_n$, $-\text{OC}_{0-4}$ alkyl, $-\text{N}(\text{C}_{0-4}\text{alkyl})(\text{C}_{0-4}\text{alkyl})$, $-\text{C}(\text{=O})\text{OC}_{1-4}$ alkyl, $-\text{C}(\text{=O})\text{C}_{0-4}$ alkyl, or $-\text{C}(\text{=O})\text{N}(\text{C}_{0-4}\text{alkyl})(\text{C}_{0-4}\text{alkyl})$ where n is 0, 1 or 2;

R^{II} is H , halogen, cyano, nitro, C_{1-6} alkyl, C_{1-6} alkenyl, C_{1-6} alkynyl, $\text{S}(\text{=O})_n\text{C}_{1-4}$ alkyl, $-\text{S}(\text{=O})_n\text{N}(\text{C}_{1-4}\text{alkyl})_n$, $-\text{OC}_{0-4}$ alkyl, $-\text{N}(\text{C}_{0-4}\text{alkyl})(\text{C}_{0-4}\text{alkyl})$, $-\text{C}(\text{=O})\text{OC}_{1-4}$ alkyl, $-\text{C}(\text{=O})\text{C}_{0-4}$ alkyl, or $-\text{C}(\text{=O})\text{N}(\text{C}_{0-4}\text{alkyl})(\text{C}_{0-4}\text{alkyl})$ where n is 0, 1 or 2;

R^2 is $-\text{CH}_2\text{CH}_2\text{CH}_3$, $-\text{CH}_2\text{-cyclopropyl}$, $-\text{CH}_2\text{CH}(\text{CH}_3)_2$, $-\text{CH}_2\text{CH}_2\text{CH}_2\text{F}$, $-\text{CH}_2\text{-cyclobutyl}$, $-\text{CH}_2\text{C}(\text{CH}_3)_3$, $-\text{CH}_2\text{CH}_2\text{CH}(\text{CH}_3)_2$, $-\text{CH}_2\text{CF}_3$, $-\text{CH}_2\text{-methylphenyl}$, $-\text{CH}_2\text{-phenol}$, $-\text{CH}_2\text{-}(3,5\text{-dimethylisoxazol-4-yl)}$, $-\text{CH}_2\text{-S-phenyl}$, $-\text{CH}_2\text{-phenylcarboxyl}$, or $-\text{CH}_2\text{SCF}_3$;

R^3 is selected from formulas (i), (ii), (iii) or (iv) set forth below:

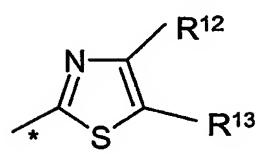
20



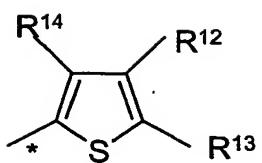
$\text{wherein } *$ is the location where (i) or (ii) or (iii) or (iv) is attached to structural formula (II),
 $\text{and } \text{X} \text{ is } \text{C} \text{ or } \text{N}; \text{ and } \text{Z} \text{ is } \text{O} \text{ or } \text{S}$, wherein R^{10} is at any position on the ring and R^{10} and R^{11} are independently at each instance H , R^a , halogen, $-\text{CN}$, nitro, OR^a , CF_3 , $-\text{NR}^a\text{R}^a$, $-\text{C}(\text{=O})\text{OR}^a$, $-\text{C}(\text{=O})\text{NR}^a\text{R}^a$, $-\text{OC}(\text{=O})\text{C}_{1-4}$ alkyl, $-\text{NR}^a\text{C}(\text{=O})\text{C}_{1-4}$ alkyl or $-\text{S}(\text{=O})_n\text{R}^c$; and wherein
 R^{11a} is R^a , $-\text{S}(\text{=O})_2\text{NR}^a\text{R}^a$ or $-\text{S}(\text{=O})_n\text{R}^c$ and $n=1$ or 2;

R^4 is selected from formulas (a) to (z) or (aa) or (ab) set forth below:

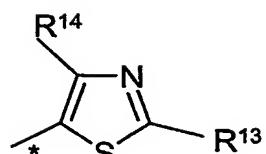
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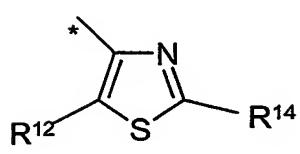
(a)



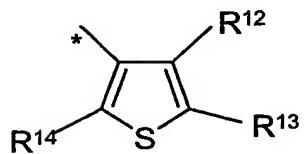
(b)



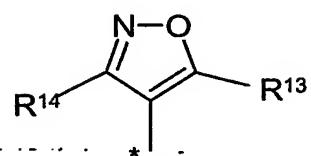
(c)



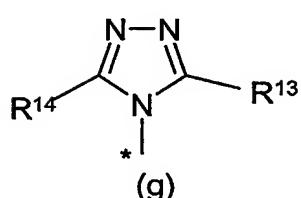
(d)



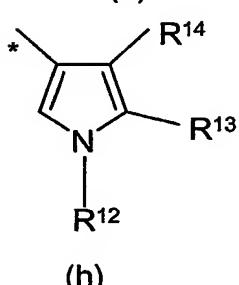
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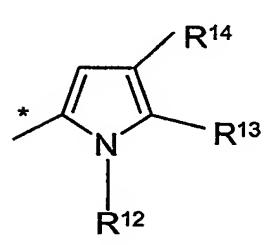
(f)



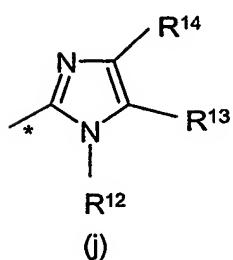
(g)



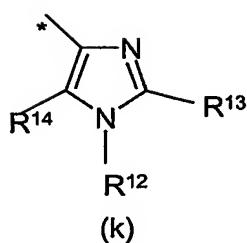
(h)



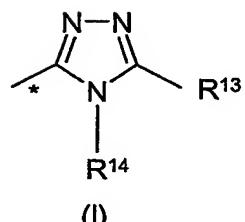
(i)



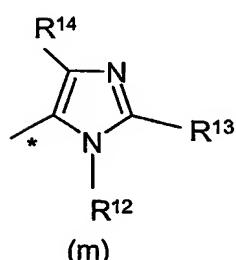
(j)



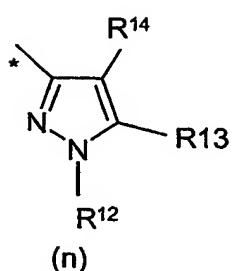
(k)



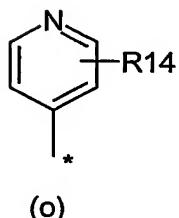
(l)



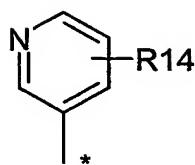
(m)



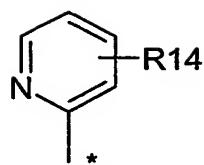
(n)



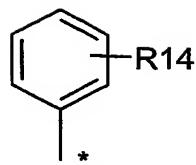
(o)



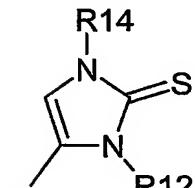
(p)



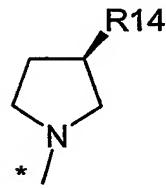
(q)



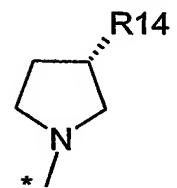
(r)



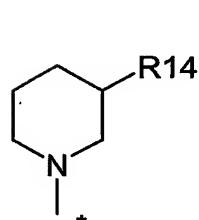
(s)



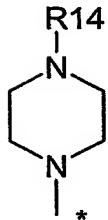
(t)



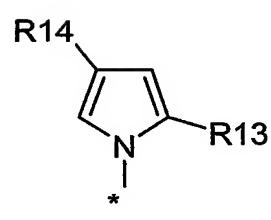
(u)



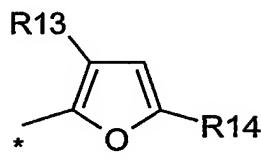
(v)



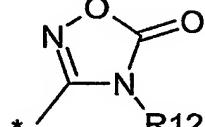
(w)



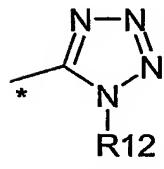
(x)



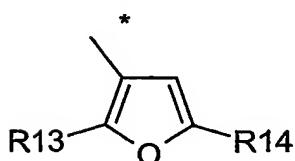
(y)



(z)



(aa)



(ab)

wherein * is the location wherein R⁴ is attached to the ring system and wherein wherein R¹², R¹³ and R¹⁴ are each independently represented by H, Het, C₁₋₆alkyl, -CN, -NR^aR^a, -nitro, -C(=O)R^a, -C(=O)NR^aR^a, -C(=O)NR^aS(=O)R^a, -C(=O)NR^a-Het, -

C(=O)NR^aNR^aR^a, -C(=O)NR^a(R^bNR^aR^a), -C(=O)NR^a(R^bOR^a), -C(=O)NR^a(R^bS(=O)₂R^a), -C(=O)NR^aR^bHet, -C(=O)NR^aOR^a, -C(=O)R^bNR^aR^a, -C(=NOR^a)R^a, -C(=NCN)R^a, -C(=O)OR^a, -C(=O)OR^bNR^aR^a, -C(=O)R^a, -OC(=O)R^a, -C(=O)R^a-SR^a, =S, -NR^aC(=O)R^a, -NR^aC(=O)OR^a, -NR^aS(=O)₂R^b, -C(=NOR^a)R^a, -S(=O)₂R^a, -S(=O)₂NR^aR^a, -S(=O)₂NR^a(R^bC(=O)NR^aR^a), or -S(=O)₂NR^a(R^bC(=O)OR^a).

9. A compound of formula (I) selected from:

5-[(6-chloroquinolin-4-yl)methyl]-6-(cyclopropylmethyl)-5-oxo-6,8-dihydro-5H-pyrazolo[4,3-e][1,2,4]triazolo[4,3-c]pyrimidin-9-yl]-1-methyl-1H-pyrrole-3-carbonitrile;

10 5-[(6-chloroquinolin-4-yl)methyl]-6-(cyclopropylmethyl)-3-methyl-5-oxo-6,8-dihydro-5H-pyrazolo[4,3-e][1,2,4]triazolo[4,3-c]pyrimidin-9-yl]-1-methyl-1H-pyrrole-3-carbonitrile;

5-[(6-chloroquinolin-4-yl)methyl]-6-(cyclopropylmethyl)-3-(dimethylamino)-5-oxo-6,8-dihydro-5H-pyrazolo[4,3-e][1,2,4]triazolo[4,3-c]pyrimidin-9-yl]-1-methyl-1H-pyrrole-3-carbonitrile;

15 5-[3-amino-8-[(6-chloroquinolin-4-yl)methyl]-6-(cyclopropylmethyl)-5-oxo-6,8-dihydro-5H-pyrazolo[4,3-e][1,2,4]triazolo[4,3-c]pyrimidin-9-yl]-1-methyl-1H-pyrrole-3-carbonitrile;

5-[(6-chloroquinolin-4-yl)methyl]-6-(cyclopropylmethyl)-5-oxo-6,8-dihydro-5H-imidazo[1,2-c]pyrazolo[4,3-e]pyrimidin-9-yl]-1-methyl-1H-pyrrole-3-carbonitrile;

5-[(6-chloroquinolin-4-yl)methyl]-6-(cyclopropylmethyl)-3-methyl-5-oxo-6,8-dihydro-5H-imidazo[1,2-c]pyrazolo[4,3-e]pyrimidin-9-yl]-1-methyl-1H-pyrrole-3-carbonitrile;

20 8-[(6-chloroquinolin-4-yl)methyl]-6-(cyclopropylmethyl)-9-(1-methyl-1H-imidazol-5-yl)-6,8-dihydro-5H-imidazo[1,2-c]pyrazolo[4,3-e]pyrimidin-5-one;

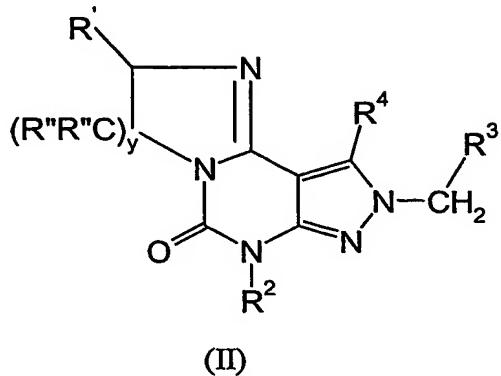
8-{[5-chloro-1-(methylsulfonyl)-1H-indol-3-yl]methyl}-6-(cyclopropylmethyl)-9-(1-methyl-1H-imidazol-5-yl)-6,8-dihydro-5H-imidazo[1,2-c]pyrazolo[4,3-e]pyrimidin-5-one;

25 8-[(6-chloroquinolin-4-yl)methyl]-6-(cyclopropylmethyl)-9-[1-methyl-4-(methylsulfonyl)-1H-pyrrol-2-yl]-6,8-dihydro-5H-imidazo[1,2-c]pyrazolo[4,3-e]pyrimidin-5-one;

5-[(6-chloroquinolin-4-yl)methyl]-6-(cyclopropylmethyl)-9-(1-methyl-4-(methylsulfonyl)-1H-pyrrol-2-yl)-6,8-dihydro-5H-imidazo[1,2-c]pyrazolo[4,3-e]pyrimidin-5-one;

30

10. A compound having the structural formula (II):



5

wherein,

R' is H, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl;

10 R'' is independently at each instance H, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl;

y is 1 or 2;

15 R² is H, optionally substituted alkyl, optionally substituted alkylcycloalkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted cycloalkenyl, optionally substituted cycloalkynyl, optionally substituted aryl, optionally substituted alkoxy, optionally substituted amino, or optionally substituted heterocycle;

R³ is a monocyclic or bicyclic, saturated or unsaturated, ring system comprising 0, 1, 2 or 3 heteroatoms independently selected from N, O, or S, the ring being substituted by 0, 1, 2 or 3 substituents selected from =O, halogen, -OR^a, C₁₋₆alkyl, C₁₋₆haloalkyl, -CN, nitro, -S(=O)_nR^c, -O(CH₂)_mHet, -O(CH₂)_mC(=O)Het, -O(CH₂)_mC(=O)NR^aR^a, -O(CH₂)_mC(=O)OR^a, -O(CH₂)_mNR^aR^a, -O(CH₂)_mOR^a, -S(CH₂)_mHet, -S(CH₂)_mC(=O)Het, -S(CH₂)_mC(=O)NR^aR^a, -S(CH₂)_mC(=O)OR^a, -S(CH₂)_mNR^aR^a, -S(CH₂)_mOR^a, -NR^aR^a, -NHC(=O)R^a, N=NR^a, aminocarbonyl, phenyl, benzyl; or R³ is represented by -Het, -Het-Het, R⁵-R⁵-Het, -Het-R⁵, -Het-O-R⁵, -R⁵-R⁵, -R⁵-OR⁵;

25 R⁴ is a monocyclic or bicyclic, saturated or unsaturated, ring system, or a vicinal-fused derivative thereof, which may contain from 5 to 12, preferably 5 to 10, ring atoms, 0, 1, 2, 3 or 4 of which are heteroatoms independently selected from N, O, or S, the ring system being substituted by 0, 1, 2 or 3 substituents selected from B(OH)₂, vicinal -OCH₂CH₂O-, vicinal -

OC₁₋₂haloalkylO-, vicinal -OCH₂O-, vicinal -CH₂OCH₂O-, =O, halogen, -R^bOR^a, -SR^a, -OR^a, C₁₋₆alkyl, C₁₋₆haloalkyl, -CN, -S(=O)_nR^c, -O(CH₂)_mHet, -O(CH₂)_mC(=O)Het, -O(CH₂)_mC(=O)NR^aR^a, -O(CH₂)_mC(=O)OR^a, -O(CH₂)_mNR^aR^a, -O(CH₂)_mOR^a, -S(CH₂)_mHet, -S(CH₂)_mC(=O)Het, -S(CH₂)_mC(=O)NR^aR^a, -S(CH₂)_mC(=O)OR^a, -S(CH₂)_mNR^aR^a, -

5 S(CH₂)_mOR^a, -NR^aR^a, -NHC(=O)R^a, -NHC(=O)OR^a, N=NR^a, NO₂, -C(=O)NR^aR^a, -C(=O)NR^aOR^a, -C(=O)NR^a(R^bNR^aR^a), -C(=O)NR^a(R^bOR^a), -C(=O)NR^a(R^bS(=O)_nR^a), -C(=O)NR^a(R^bHet), -C(=O)OR^a, -OC(=O)R^a, -C(=O)OR^bNR^aR^a, -C(=O)R^a, -C(=O)R^bNR^aR^a, -C(=NOR^a)R^a, -C(=NCN)R^a, -S(=O)₂NR^aR^a, -NR^aS(=O)₂R^a, -S(=O)₂NR^a(R^bC(=O)NR^aR^a), -S(=O)₂NR^a(R^bC(=O)OR^a), aminocarbonyl, phenyl, benzyl; or R⁴ is represented by -(CH₂)_nR⁵.

10 Het, -(CH₂)_nR^d, -Het, -Het-Het, R⁵, -R⁵-Het, -Het-R⁵, -Het-OR⁵, R⁵-R⁵, or -R⁵-OR⁵; or R⁴ is represented by C₁₋₆alkyl, -NC₁₋₆alkyl, or -N(C₁₋₆alkyl)₂. wherein the C₁₋₆alkyl, -NC₁₋₆alkyl, -N(C₁₋₆alkyl) are substituted by 0, 1 or 2 substituents selected from R^a, OR^a, halogen or phenyl wherein R⁴ is not -(CH₂)₂CH₃, -(CH₂)₂CH₂OH, -(CH₂)₂CO₂H, or -(CH₂)₂CO₂C₁₋₆alkyl wherein z is 1,2,3,4,5, or 6;

15 R⁵ is independently at each instance, phenyl substituted by 0, 1, 2, or 3 groups selected from halogen, C₁₋₆haloalkyl, -OC₁₋₆haloalkyl, C₁₋₆alkyl, -CN, nitro, -OR^a, -S(=O)_nR^c, -O(CH₂)_mHet, -O(CH₂)_mC(=O)Het, -O(CH₂)_mC(=O)NR^aR^a, -O(CH₂)_mC(=O)OR^a, -O(CH₂)_mNR^aR^a, -O(CH₂)_mOR^a, -S(CH₂)_mHet, -S(CH₂)_mC(=O)Het, -S(CH₂)_mC(=O)NR^aR^a, -S(CH₂)_mC(=O)OR^a, -S(CH₂)_mNR^aR^a, -S(CH₂)_mOR^a, -R^bOR^a, -SR^a, -C(=O)NR^aR^a, -

20 C(=O)NR^aOR^a, -C(=O)NR^aR^bNR^aR^a, -C(=O)NR^aR^bOR^a, -C(=O)NR^aR^bS(=O)_nR^a, -C(=O)NR^aR^bHet, -C(=O)OR^a, -OC(=O)R^a, -C(=O)OR^bNR^aR^a, -C(=O)R^a, -C(=O)R^bNR^aR^a, -C(=NOR^a)R^a, -C(=NCN)R^a, -S(=O)₂NR^aR^a, -NR^aS(=O)₂R^a, -S(=O)₂NR^aR^bC(=O)NR^aR^a, or -S(=O)₂NR^aR^bC(=O)OR^a;

R^a is, independently at each instance, H, C₁₋₆alkyl, -C(=O)C₁₋₄alkyl, C₁₋₄haloalkyl, phenyl, benzyl, or 5 or 6-membered ring, saturated or unsaturated heterocycle containing 1,2,3, or 4 heteroatoms independently selected from N, O or S;

25 R^b is, independently at each instance, C₁₋₆alkyl, -C(=O)C₁₋₄alkyl, C₁₋₄haloalkyl, phenyl, benzyl, or 5 or 6-membered ring, saturated or unsaturated heterocycle containing 1,2,3, or 4 heteroatoms independently selected from N, O or S;

30 R^c is C₁₋₆alkyl, C₁₋₄haloalkyl, phenyl or benzyl;

R^d is phenyl substituted by 0, 1 or 2 groups selected from -CN, halogen, nitro, C₁₋₆alkyl, C₁₋₄haloalkyl, -OH, -OR^c, -NR^aR^a, -S(=O)_nR^c, -C(=O)NR^aR^a, -C(=O)OR^a, -NR^aC(=O)R^a, -OC(=O)R^a, B(OH)₂, vicinal -OCH₂CH₂O-, vicinal -OC₁₋₂haloalkylO-, vicinal

-OCH₂O-, vicinal -CH₂OCH₂O-, phenyl, benzyl and a 5- or 6-membered ring, saturated or unsaturated heterocycle containing 1, 2, 3 or 4 heteroatoms independently selected from N, O, or S;

5 m is 1, 2 or 3;

n is 0, 1 or 2;

or a pharmaceutically acceptable salt thereof.

11. A compound as recited in Claim 10 wherein:

R' is H, C₁₋₆alkyl, C₁₋₆alkenyl, C₁₋₆alkynyl.

10

12. A compound as recited in Claim 10 wherein:

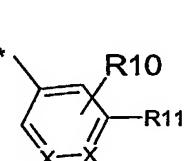
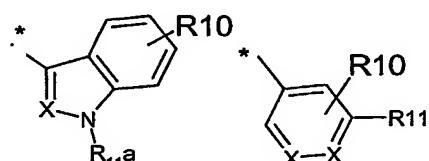
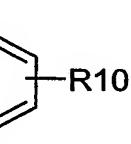
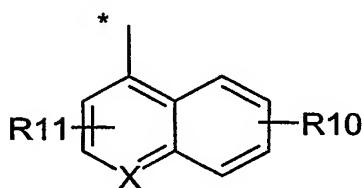
R" is independently at each instance H, C₁₋₆alkyl, C₁₋₆alkenyl, C₁₋₆alkynyl.

13. A compound as recited in Claim 10 wherein:

15 R² is C₁₋₆alkylC₃₋₆cycloalkyl or -C₁₋₁₂alkyl wherein either is optionally substituted with 0, 1, 2 or 3 substituents selected from Het, S(=O)_nR^c, -S(=O)_nNR^aR^a, halogen, -CN, -OR^a, -NR^aR^a, -C(=O)OR^a, -C(=O)NR^aR^a, -OC(=O)C₁₋₄alkyl, or -NR^aC(=O)C₁₋₄alkyl and n is 0, 1 or 2.

20 14. A compound as recited in Claim 10 wherein:

R³ is selected from formulas (i), (ii), (iii) or (iv) set forth below:



(i)

(ii)

(iii)

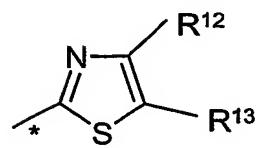
(iv)

25 wherein * is the location where (i) or (ii) or (iii) or (iv) is attached to structural formula (I), and X is C or N; and Z is O or S, wherein R¹⁰ is at any position on the ring and R¹⁰ and R¹¹ are independently at each instance H, R^a, halogen, -CN, nitro, OR^a, CF₃, -NR^aR^a, -C(=O)OR^a, -C(=O)R^a, -C(=O)NR^aR^a, -OC(=O)C₁₋₄alkyl, -NR^aC(=O)C₁₋₄alkyl or -S(=O)_nR^c; and wherein R^{11a} is R^a, -S(=O)₂NR^aR^a or -S(=O)_nR^c and n=1 or 2.

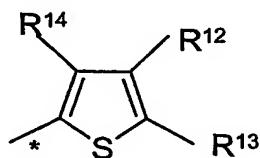
30

15. A compound as recited in Claim 10 wherein:

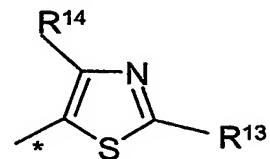
R^4 is selected from formulas (a) to (z) or (aa) or (ab) set forth below:



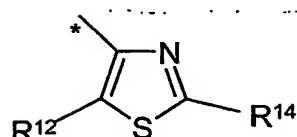
(a)



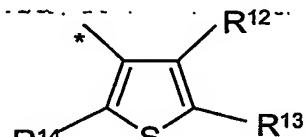
(b)



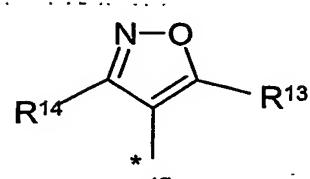
(c)



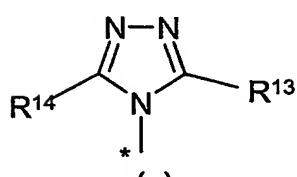
(d)



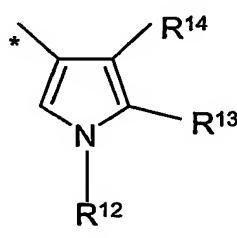
(e)



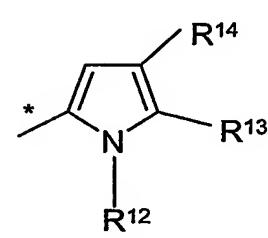
(f)



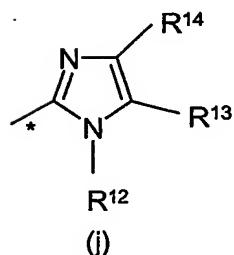
(g)



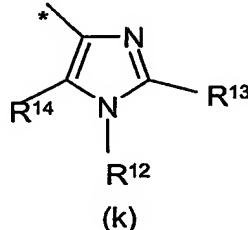
(h)



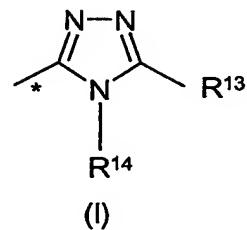
(i)



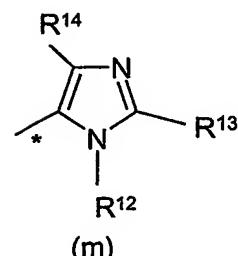
(j)



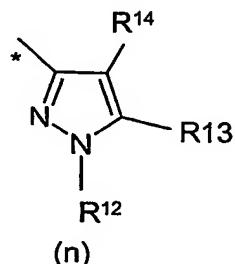
(k)



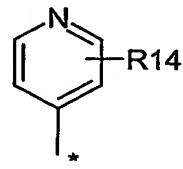
(l)



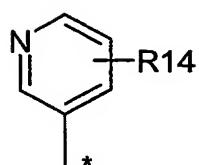
(m)



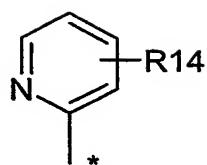
(n)



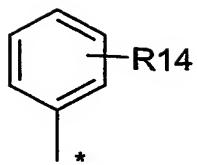
(o)



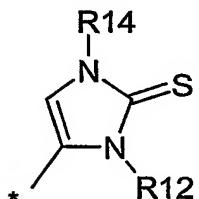
(p)



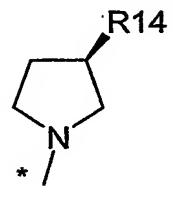
(q)



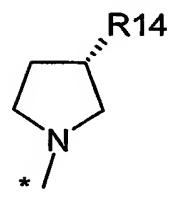
(r)



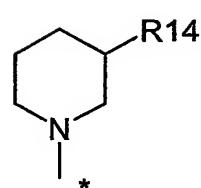
(s)



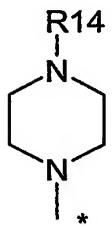
(t)



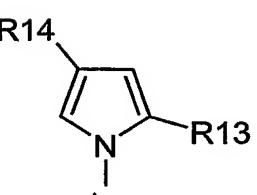
(u)



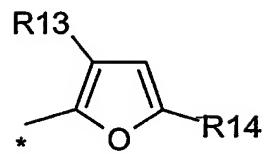
(v)



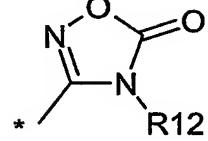
(w)



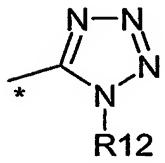
(x)



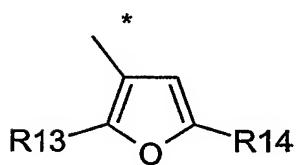
(y)



(z)



(aa)



(ab)

wherein * is the location wherein R⁴ is attached to the ring system and wherein wherein R¹², R¹³ and R¹⁴ are each independently represented by H, Het, C₁₋₆alkyl, -CN, -NR^aR^a, -nitro, -C(=O)R^a, -C(=O)NR^aR^a, -C(=O)NR^aS(=O)R^a, -C(=O)NR^a-Het, -

$\text{C}(\text{=O})\text{NR}^a\text{NR}^a\text{R}^a$, $-\text{C}(\text{=O})\text{NR}^a(\text{R}^b\text{NR}^a\text{R}^a)$, $-\text{C}(\text{=O})\text{NR}^a(\text{R}^b\text{OR}^a)$, $-\text{C}(\text{=O})\text{NR}^a(\text{R}^b\text{S}(\text{=O})_2\text{R}^a)$, $-\text{C}(\text{=O})\text{NR}^a\text{R}^b\text{Het}$, $-\text{C}(\text{=O})\text{NR}^a\text{OR}^a$, $-\text{C}(\text{=O})\text{R}^b\text{NR}^a\text{R}^a$, $-\text{C}(\text{=NOR}^a)\text{R}^a$, $-\text{C}(\text{=NCN})\text{R}^a$, $-\text{C}(\text{=O})\text{OR}^a$, $-\text{C}(\text{=O})\text{OR}^b\text{NR}^a\text{R}^a$, $-\text{C}(\text{=O})\text{R}^a$, $-\text{OC}(\text{=O})\text{R}^a$, $-\text{C}(\text{=O})\text{R}^a\text{-SR}^a$, $=\text{S}$, $-\text{NR}^a\text{C}(\text{=O})\text{R}^a$, $-\text{NR}^a\text{C}(\text{=O})\text{OR}^a$, $-\text{NR}^a\text{S}(\text{=O})_2\text{R}^b$, $-\text{C}(\text{=NOR}^a)\text{R}^a$, $-\text{S}(\text{=O})_2\text{R}^a$, $-\text{S}(\text{=O})_2\text{NR}^a\text{R}^a$, $-\text{S}(\text{=O})_2\text{NR}^a(\text{R}^b\text{C}(\text{=O})\text{NR}^a\text{R}^a)$, or $-\text{S}(\text{=O})_2\text{NR}^a(\text{R}^b\text{C}(\text{=O})\text{OR}^a)$.

16. A compound as recited in Claim 10 wherein:

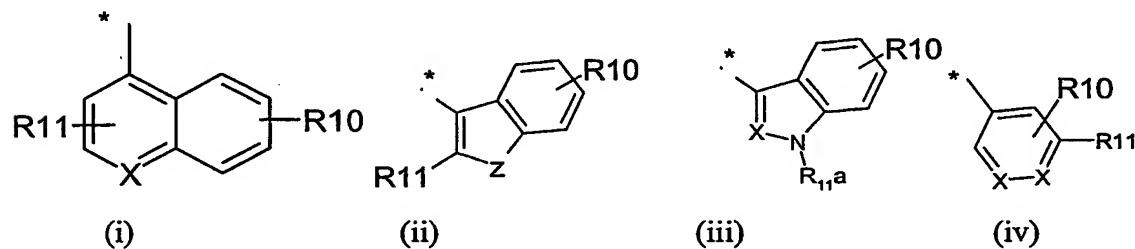
R' is H, C_{1-6} alkyl, C_{1-6} alkenyl, C_{1-6} alkynyl;

R'' is independently at each instance H, C_{1-6} alkyl, C_{1-6} alkenyl, C_{1-6} alkynyl;

10 y is 1;

R^2 is $-\text{CH}_2\text{CH}_2\text{CH}_3$, $-\text{CH}_2\text{-cyclopropyl}$, $-\text{CH}_2\text{CH}(\text{CH}_3)_2$, $-\text{CH}_2\text{CH}_2\text{CH}_2\text{F}$, $-\text{CH}_2\text{-cyclobutyl}$, $-\text{CH}_2\text{C}(\text{CH}_3)_3$, $-\text{CH}_2\text{CH}_2\text{CH}(\text{CH}_3)_2$, $-\text{CH}_2\text{CF}_3$, $-\text{CH}_2\text{-methylphenyl}$, $-\text{CH}_2\text{-phenol}$, $-\text{CH}_2\text{-}(3,5\text{-dimethylisoxazol-4-yl)}$, $-\text{CH}_2\text{-S-phenyl}$, $-\text{CH}_2\text{-phenylcarboxyl}$, or $-\text{CH}_2\text{SCF}_3$;

15 R^3 is selected from formulas (i), (ii), (iii) or (iv) set forth below:

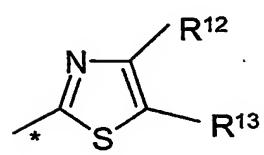


wherein * is the location where (i) or (ii) or (iii) or (iv) is attached to structural formula (I),

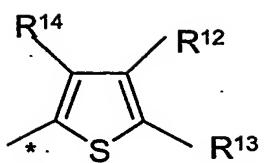
20 and X is C or N; and Z is O or S, wherein R^{10} is at any position on the ring and R^{10} and R^{11} are independently at each instance H, R^a , halogen, -CN, nitro, OR^a , CF_3 , $-\text{NR}^a\text{R}^a$, $-\text{C}(\text{=O})\text{OR}^a$, $-\text{C}(\text{=O})\text{NR}^a\text{R}^a$, $-\text{OC}(\text{=O})\text{C}_{1-4}\text{alkyl}$, $-\text{NR}^a\text{C}(\text{=O})\text{C}_{1-4}\text{alkyl}$ or $-\text{S}(\text{=O})_n\text{R}^c$; and wherein R^{11a} is R^a , $-\text{S}(\text{=O})_2\text{NR}^a\text{R}^a$ or $-\text{S}(\text{=O})_n\text{R}^c$ and $n=1$ or 2;

R^4 is selected from formulas (a) to (z) or (aa) or (ab) set forth below:

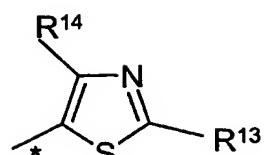
25



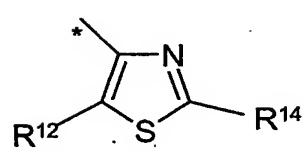
(a)



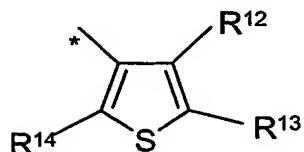
(b)



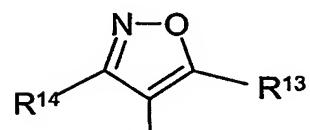
(c)



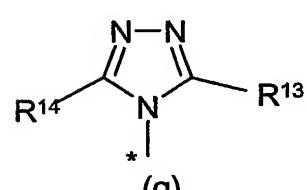
(d)



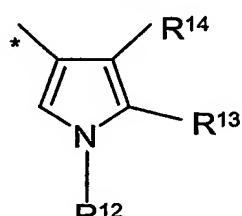
(e)



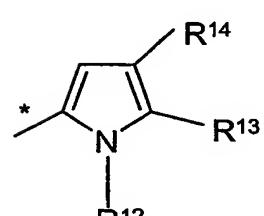
(f)



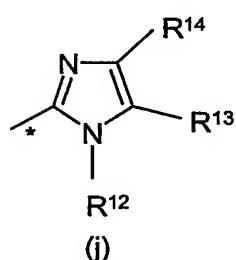
(g)



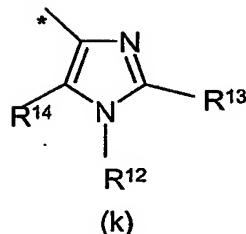
(h)



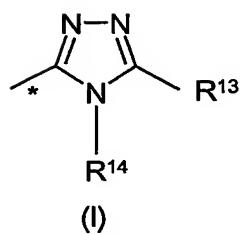
(i)



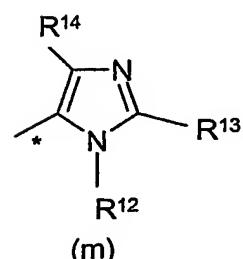
(j)



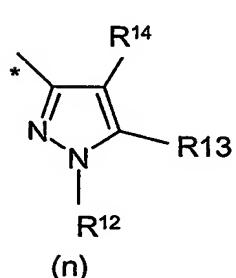
(k)



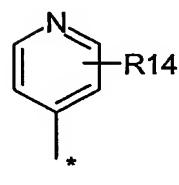
(l)



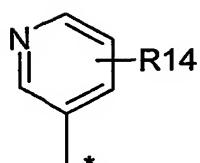
(m)



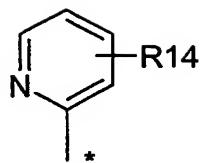
(n)



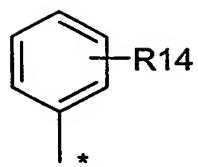
(o)



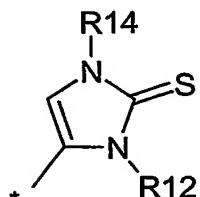
(p)



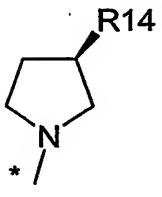
(q)



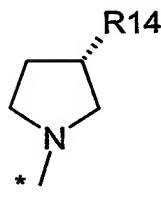
(r)



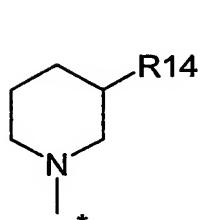
(s)



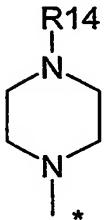
(t)



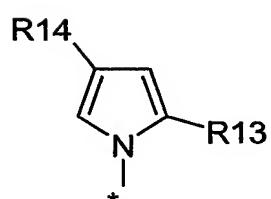
(u)



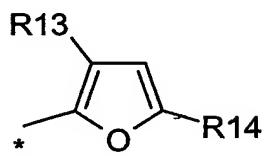
(v)



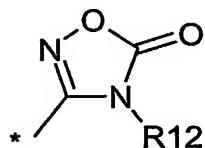
(w)



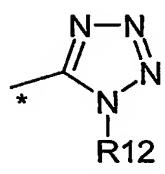
(x)



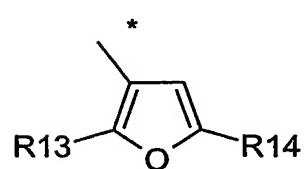
(y)



(z)



(aa)



wherein * is the location wherein R⁴ is attached to the ring system and wherein wherein R¹², R¹³ and R¹⁴ are each independently represented by H, Het, C₁₋₆alkyl, -CN, -NR^aR^a, -nitro, -C(=O)R^a, -C(=O)NR^aR^a, -C(=O)NR^aS(=O)R^a, -C(=O)NR^a-Het, -

C(=O)NR^aNR^aR^a, -C(=O)NR^a(R^bNR^aR^a), -C(=O)NR^a(R^bOR^a), -C(=O)NR^a(R^bS(=O)₂R^a), -C(=O)NR^aR^bHet, -C(=O)NR^aOR^a, -C(=O)R^bNR^aR^a, -C(=NOR^a)R^a, -C(=NCN)R^a, -C(=O)OR^a, -C(=O)OR^bNR^aR^a, -C(=O)R^a, -OC(=O)R^a, -C(=O)R^a-SR^a, =S, -NR^aC(=O)R^a, -NR^aC(=O)OR^a, -NR^aS(=O)₂R^b, -C(=NOR^a)R^a, -S(=O)₂R^a, -S(=O)₂NR^aR^a, -S(=O)₂NR^a(R^bC(=O)NR^aR^a), or -S(=O)₂NR^a(R^bC(=O)OR^a.

17. A compound of formula (II) selected from:

5-{8-[(6-chloroquinolin-4-yl)methyl]-6-isobutyl-5-oxo-2,5,6,8-tetrahydro-3H-imidazo[1,2-c]pyrazolo[4,3-e]pyrimidin-9-yl}-1-methyl-1H-pyrrole-3-carbonitrile; 5-[(6-chloroquinolin-4-yl)methyl]-6-isobutyl-5-oxo-2,5,6,8-tetrahydro-3H-imidazo[1,2-c]pyrazolo[4,3-e]pyrimidin-9-yl}-1-methyl-1H-pyrrole-3-carbonitrile; 5-[(6-chloroquinolin-4-yl)methyl]-6-(cyclopropylmethyl)-3-methyl-5-oxo-2,5,6,8-tetrahydro-3H-imidazo[1,2-c]pyrazolo[4,3-e]pyrimidin-9-yl]-1-methyl-1H-pyrrole-3-carbonitrile; 5-[(6-chloroquinolin-4-yl)methyl]-6-(cyclopropylmethyl)-2-methyl-5-oxo-2,5,6,8-tetrahydro-3H-imidazo[1,2-c]pyrazolo[4,3-e]pyrimidin-9-yl]-1-methyl-1H-pyrrole-3-carbonitrile; 5-[(3R)-8-[(6-chloroquinolin-4-yl)methyl]-6-(cyclopropylmethyl)-3-methyl-5-oxo-2,5,6,8-tetrahydro-3H-imidazo[1,2-c]pyrazolo[4,3-e]pyrimidin-9-yl]-1-methyl-1H-pyrrole-3-carbonitrile; 5-[(3S)-8-[(6-chloroquinolin-4-yl)methyl]-6-(cyclopropylmethyl)-3-methyl-5-oxo-2,5,6,8-tetrahydro-3H-imidazo[1,2-c]pyrazolo[4,3-e]pyrimidin-9-yl]-1-methyl-1H-pyrrole-3-carbonitrile; 5-[(6-chloroquinolin-4-yl)methyl]-7-(cyclopropylmethyl)-6-oxo-2,3,4,6,7,9-hexahdropyrazolo[4,3-e]pyrimido[1,2-c]pyrimidin-10-yl]-1-methyl-1H-pyrrole-3-carbonitrile.

18. A compound according to any one of claims 1 to 17, for use as a medicament.

30 19. The use of a compound as defined in any one of claims 1 to 17, in the manufacture of a medicament for the treatment or prophylaxis of disorders associated with *H. pylori* infection.

20. A method for the treatment of infections associated with *H. pylori* comprising administering to a host in need of such treatment a therapeutically effective amount of a compound as defined in any one of claims 1 to 17.

5 21. A method for the prophylaxis treatment of infections associated with *H. pylori* comprising administering to a host in need of such treatment a therapeutically effective amount of a compound as defined in any one of claims 1 to 17.

10 22. A method for the treatment or prophylaxis of *H. pylori* infection comprising administering a therapeutically effective amount of a compound as defined in any one of claims 1 to 16 or a pharmaceutically acceptable salt as claimed in any one of claims 1 to 17.

23. A pharmaceutical composition comprising a compound as defined in any one of claims 1 to 17 together with at least one pharmaceutically acceptable carrier, diluent or excipient.